



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,575	02/10/2004	Herry Sutanto	306582.01/MFCP.149540	8896
45809 7590 03/16/2010 SHOOK, HARDY & BACON L.L.P. (MICROSOFT CORPORATION) INTELLECTUAL PROPERTY DEPARTMENT 2555 GRAND BOULEVARD KANSAS CITY, MO 64108-2613				
EXAMINER				
KINSAUL, DANIEL W				
ART UNIT		PAPER NUMBER		
2165				
MAIL DATE		DELIVERY MODE		
03/16/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/774,575

Applicant(s)

SUTANTO ET AL.

Examiner

DANIEL KINSAUL

Art Unit

2165

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 December 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS/US)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Remarks

1. Applicants' amendment of 12/18/09 - amending the claims, Fig. 3, and specification paragraphs 20, 41 and 43 - has been received and entered. Claims 1-24 are pending.
2. Applicants' amendment has overcome the previously presented 101 rejections of claims 5 and 13-24 - with the understanding that applicants' amendment to the specification constitutes a clear disavowal of any non-statutory subject matter (such as signals, energy, etc.). Examiner withdraws the rejection.
3. Prior art not cited in the current PTO-892 may be found in the prior 892 form.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. Claims 1-5 and 14-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Recognizing Mathematical Expressions Using Tree Transformations,” by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1).

With respect to independent claim 1, Zanibbi discloses a **computer-implemented method for processing data using a computer system having processor, memory, and data storage subsystems** at Abstract, p. 1457, Fig. 3 (i.e. the method takes place in a computing system using code, etc.).

Transforming data from a first data structure to a second data structure via the processor is disclosed at p. 1456, col. 1, paragraph 3 (i.e. the structure is organized into a first tree - BST - and then transformed into a second tree - operator tree).

Wherein the second data structure includes at least a first set of leaf nodes under a first ancestor node and a second set of leaf nodes under a second ancestor node is disclosed at p. 1456, col. 2, Fig. 2(d) (i.e. operator tree with two sets of leaf nodes under two ancestor nodes).

Identifying one or more potential candidate nodes for the first ancestor node via the processor based, at least in part, on ancestor nodes from the first data structure associated with the leaf nodes in the first set and identifying one or more potential candidate nodes for the second ancestor node **via the processor** based, at least in part, on ancestor nodes from the first data structure associated with the leaf nodes in the second set is disclosed at p. 1456, col. 2, Fig. 2(b)-(d) (i.e. the root nodes Integer Subtract, integer add, exponent, and divide

in the operator tree (d) are determined by their relationships with leaf nodes of the first set (A and C) and second set (B and 2) as well as D).

Assigning the first ancestor node based on a selection of the potential candidate node most often identified as associated with the leaf nodes in the first set at p. 1456, col. 2, Fig. 2 (i.e. leaf nodes AC and most identified as associated with the superscript node, which becomes the ancestor node Exponent in the final tree of 2(b)). Selection is the process of determining which node to place where in the subsequently transformed tree.

It is noted that Zanibbi does not appear to explicitly disclose **assigning the second ancestor node based on a selection of one or more criteria other than the potential candidate node most often identified as associated with the leaf nodes in the second set.** However, Weise discloses this limitation at col. 8, lines 7-41 (i.e. logic in the parser for applying syntax rules in the placement of nodes - where nodes may be combined into a new intermediate-level node - where the "criteria other" is based on syntax rules for joining and creating new nodes).

Additionally, it is noted that Zanibbi discloses a selection process at least at col. 8, lines 7-41 for determining which nodes to place or combine into the full-sentence syntax parse tree.

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi and Weise before him or her, to modify the tree transformation system of Zanibbi et al with the parser system of Weise; because Weise teaches that this limitation is useful in a parsing system employing a tree structure (Abstract).

With respect to dependent claim 2, Zanibbi discloses **assigning the second ancestor node is based upon the second most often identified potential candidate node** at p. 1456, col. 2, Fig. 2 (i.e. the second set of leaf nodes is most identified as associated with the divide line or fraction node, which becomes the ancestor node Divide in the final tree of 2(b)).

With respect to dependent claim 3, it is noted that Zanibbi does not appear to explicitly disclose that **assigning the second ancestor node comprises creating a new node**. However, Weise discloses this limitation at col. 8, lines 7-41 (i.e. the logic of the parse tree includes an operation for combining two certain types of nodes into a new intermediate-level node - based on syntax rules).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi and Weise before him or her, to modify the tree transformation system of Zanibbi et al with the parser system of Weise; because Weise teaches that this limitation is useful in a parsing system employing a tree structure (Abstract).

With respect to dependent claim 4, it is noted that Zanibbi does not appear to explicitly disclose **determining which potential candidate node to assign as the first ancestor node and which potential candidate node to assign as the second ancestor node, based, at least in part, on a determination of which arrangement of potential candidate nodes will most reduce data processing operations when converting an original document data structure to a form represented by the second data structure**. However, Weise discloses this limitation at

col. 3, lines 13-30 (i.e. the method of the invention is geared towards making parsers more accurate and efficient); col. 4, lines 24-41 (i.e. identifying the best candidate node that will generate the complete correct parse tree most efficiently).

With respect to dependent claim 5, Zanibbi et al discloses a **computer-readable medium having computer-executable instructions stored thereon for performing the method of claim 1** at p. 1457, col. 1, paragraph 2 (i.e. use of a programming language and code to implement the transformation system). Additionally, Weise discloses this limitation at claim 15.

With respect to independent claim 14, the claim corresponds to independent claim 1 and dependent claim 2; and is rejected for the reasons discussed above.

With respect to dependent claim 15, the claim corresponds to dependent claim 2, and is rejected for the reasons discussed above.

With respect to dependent claim 16, Zanibbi discloses that **the assigned first ancestor node differs from the assigned second ancestor node** at p. 1456, col. 2, Fig. 2 (i.e. exponent and divide ancestor nodes).

With respect to dependent claim 17, the claim corresponds to dependent claim 4, and is rejected for the reasons discussed above.

With respect to independent claim 18, the claim corresponds to independent claims 1 and 14 and dependent claim 2; and is rejected for the reasons discussed above. Furthermore, Zanibbi discloses that **the assigned first ancestor node comprises data preserved and maintained from the first data structure** at p. 1456, Fig. 2 (i.e. the nodes mathematical operations which are "preserved and maintained" as mathematical operators through the transformation).

With respect to dependent claim 19, the claim corresponds to dependent claim 2, and is rejected for the reasons discussed above.

With respect to dependent claim 20, the claim corresponds to dependent claim 4 and is rejected for the reasons discussed above.

With respect to dependent claim 21, the claim corresponds to dependent claim 3, and is rejected for the reasons discussed above.

With respect to dependent claim 22, Zanibbi discloses **creating a revised document data structure based on the second data structure and the assigned potential candidate node** at p. 1455, col. 1, Introduction (i.e. an application of the system is the conversion of scientific papers from printed to electronic form); Abstract (i.e. the Lexed BST is translated into Latex).

With respect to dependent claim 23, Zanibbi et al discloses that **the data in the first data structure represents electronic ink data** at p. 1455, Introduction (recognition of handwritten expressions permit users to write mathematical expressions on a data tablet); p. 1456, Fig. 2(a), 2(b) (i.e. the first tree is constructed from the electronic ink data of (a)).

With respect to dependent claim 24, Zanibbi et al discloses that **transforming includes parsing electronic ink data into a hierarchical data structure corresponding to the second data structure** at p. 1456, paragraphs 2-5; Fig. 2(a) (i.e. analyzing symbol layouts by searching for linear structures in the input; ability to handle irregular symbol layouts present in handwritten expressions; linear structures are organized into a BST as the basis for all subsequent processing).

7. Claims 6-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Recognizing Mathematical Expressions Using Tree Transformations,” by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1), and in further view of Au (US Pub. No. 2003/0130976 A1).

With respect to independent claim 6, the claim corresponds to independent claim 1 and dependent claim 2; and is rejected for the reasons discussed above. Furthermore, Zanibbi discloses that **the assigned first ancestor node comprises data preserved and maintained from the first data structure** at p. 1456, Fig. 2 (i.e. the nodes mathematical operations which are “preserved and maintained” as mathematical operators through the transformation). Furthermore, Weise discloses this limitation at col. 8, lines 7-41 (i.e. the system preserves parts

Art Unit: 2165

of speech and phrases through the transformation - rearranging them and combining them as necessary - but the information itself is maintained and preserved).

It is noted that Zanibbi and Weise do not appear to explicitly disclose transforming data, said identifying one or more potential candidate nodes for the first ancestor node, said identifying one or more potential candidate nodes for the second ancestor node, said assigning the first ancestor node, and said assigning the second ancestor node are all conducted incrementally as additional input is received. However, Au discloses this limitation at paragraphs [0149-152] (i.e. passing along additional input along with the current set of candidate nodes to the beginning of another pass through the method - indicative of a repeating process); paragraph [0162] (i.e. the natural language processing system repeatedly responding to a user's input while refining a context node set).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi, Weise and Au before him or her, to modify the tree transformation system of Zanibbi et al and the parser system of Weise with the natural language method of Au; because Au teaches that these limitations are useful in a system employing parse trees for input (paragraph [0115]) that use candidate nodes for analyzing meaning (paragraph [0086], [0090]).

With respect to dependent claim 7, the claim corresponds to dependent claim 2 and is rejected for the reasons discussed above.

With respect to dependent claim 8, the claim corresponds to dependent claim 4, and is rejected for the reasons discussed above.

With respect to dependent claim 9, the claim corresponds to dependent claim 3, and is rejected for the reasons discussed above.

With respect to dependent claim 10, Zanibbi discloses **creating a revised document data structure based on the second data structure and the assigned potential candidate node** at p. 1455, col. 1, Introduction (i.e. an application of the system is the conversion of scientific papers from printed to electronic form); Abstract (i.e. the Lexed BST is translated into Latex).

With respect to dependent claim 11, Zanibbi discloses that **the assigned first ancestor node differs from the assigned second ancestor node** at p. 1456, col. 2, Fig. 2 (i.e. exponent and divide ancestor nodes).

With respect to dependent claim 12, Zanibbi et al discloses that **transforming includes parsing electronic ink data into a hierarchical data structure corresponding to the second data structure** at p. 1456, paragraphs 2-5; Fig. 2(a) (i.e. analyzing symbol layouts by searching for linear structures in the input; ability to handle irregular symbol layouts present in handwritten expressions; linear structures are organized into a BST as the basis for all subsequent processing).

With respect to dependent claim 13, the claim corresponds to dependent claim 5, and is rejected for the reasons discussed above.

8. [Alternative rejection of claim 4, 17, 20] Claims 4, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Recognizing Mathematical Expressions Using Tree Transformations,” by Zanibbi et al (2002), (hereinafter Zanibbi) in view of Weise (US Pat. No. 6,275,791 B1) - as applied in claims 1, 14 and 18 - in further view of Abe et al (US Pub. No. 2004/0088652 A1).

With respect to dependent claim 4, it is noted that Zanibbi does not appear to explicitly disclose the limitations of the claim. Weise's disclosing of the limitations has been discussed above; however, Abe discloses this limitation as well, at paragraphs [0058-0059], [0065] (i.e. the use of a minimum-cost operation sequence for the transformation of one tree structure into another).

At the time of the invention, it would have been obvious to one of ordinary skill in the art, having the teachings of Zanibbi et al, Weise and Abe et al before him or her, to modify the teachings of Zanibbi and Weise with the structured document system of Abe et al, because Abe et al teaches that these limitations are useful in maintaining addressing information for modifications to tree-structured data items - between an unstructured data tree and a modified data tree (paragraphs [0030-0033]).

With respect to dependent claims 17 and 20, the claims correspond to dependent claim 4, and are rejected for the reasons discussed above. Furthermore, dependent claim 8 corresponds to dependent claim 4, and would be rejected with the modification of the additional reference used in the rejection of claim 6.

Response to Arguments

9. Applicant's arguments filed 18 December 2009 have been fully considered but they are not persuasive.

Applicants argue that Zanibbi is improper because it fails to disclose a "selection" step as recited in the claims. Examiner respectfully disagrees. Paragraph [0060] of applicants' specification appears to describe selection as it is disclosed in the Zanibbi reference - namely the decision of which nodes to place where in a revised tree based on some criteria. Selection is a broad term, and any means of deciding which nodes to place where in the tree would constitute a type of selection. If the intended meaning of the term with respect to applicant's invention is more specific or detailed, it is recommended that applicants amend the claims to more fully describe the purported distinctions.

Applicants further argue that Zanibbi fails to describe other criteria as recited in amended claim 1 and corresponding claims. New art has been cited to address this.

Furthermore, applicants assert that the prior cited references fail to disclose the "preserved and maintained" and "additional input" limitations. New art has been cited to address these limitations.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Heide (US Pat. No. 5,581,634) discloses a recognition system that includes creating tree structures in response to input characters.

Hirayama (US Pat. No. 6,112,173) discloses a pattern recognition device using a tree structure that includes choosing nodes based on criteria other than the most associated node.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL KINSAUL whose telephone number is (571)272-9014.

The examiner can normally be reached on Monday through Thursday, 8:00am till 5:00pm, alternate Fridays, est..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Neveen Abel-jalil can be reached on (571)272-4074. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DK/ 3-12-10

/Neeven Abel-Jalil/
Supervisory Patent Examiner, Art Unit 2165